P.B. SIDDHARTHA COLLEGE OF ARTS & SCIENCE
Siddhartha Nagar, Vijayawada – 520 010
Autonomous - ISO 9001 – 2015 Certified

Title of the Paper ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Offered to: BSc(CHE,MATHS, PHY,STAT, CSC, AI,CSCS,DA,DS,ELE)
Course Type : Core (TH)

Year of Introduction: 2023	**Year of offering: 2023**
Year of Revision: 2023-24	**Percentage of Revision:**
Semester: I	**Credits: 4**
Hours Taught: 60 hrs. Per Semester	**Max.Time**: 5Hours
Course Prerequisites (if any):	

I -SEMESTER
COURSE 1: ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours: 5hrs/week   **Credits: 4**

Course Objective:
The objective of this course is to provide students with a comprehensive understanding of the essential concepts and applications of mathematical, physical, and chemical sciences. The course aims to develop students' critical thinking, problem-solving, and analytical skills in these areas, enabling them to apply scientific principles to real-world situations.

Learning outcomes:
1. Apply critical thinking skills to solve complex problems involving complex numbers, trigonometric ratios, vectors, and statistical measures.
2. To explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to connect their knowledge of physics to everyday situations
3. To explain the basic principles and concepts underlying a broad range of fundamental areas of chemistry and to Connect their knowledge of chemistry to daily life.
4. Understand the interplay and connections between mathematics, physics, and chemistry in various applications. Recognize how mathematical models and physical and chemical
Principles can be used to explain and predict phenomena in different contexts.
5 To explore the history and evolution of the Internet and to gain an understanding of network security concepts, including threats, vulnerabilities, and countermeasures.

UNIT I: ESSENTIALS OF MATHEMATICS: **9hrs**

Complex Numbers: Introduction of the new symbol i – General form of a complex number – Modulus- Amplitude form and conversions

Trigonometric Ratios: Trigonometric Ratios and their relations – Problems on calculation of angles
Vectors: Definition of vector addition – Cartesian form – Scalar and vector product and problems
Statistical Measures: Mean, Median, Mode of a data and problems

UNIT II: ESSENTIALS OF PHYSICS: 9hrs
Definition and Scope of Physics- Measurements and Units - Motion of objects: Newtonian Mechanics and relativistic mechanics perspective - Laws of Thermodynamics and Significance- Acoustic waves and electromagnetic waves- Electric and Magnetic fields and their interactions- Behaviour of atomic and nuclear particles- Wave-particle duality, the uncertainty principle- Theories and understanding of universe

UNIT III: ESSENTIALS OF CHEMISTRY: 9hrs
Definition and Scope of Chemistry- Importance of Chemistry in daily life -Branches of chemistry and significance- Periodic Table- Electronic Configuration, chemical changes, classification of matter, Biomolecules- carbohydrates, proteins, fats and vitamins.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY: 9hrs
Applications of Mathematics in Physics & Chemistry: Calculus, Differential Equations & Complex Analysis.
 Application of Physics in Industry and Technology: Electronics and Semiconductor Industry, Robotics and Automation, Automotive and Aerospace Industries, Quality Control and Instrumentation, Environmental Monitoring and Sustainable Technologies.
Application of Chemistry in Industry and Technology: Chemical Manufacturing, Pharmaceuticals and Drug Discovery, Materials Science, Food and Beverage Industry.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE: 9hrs
Milestones of computer evolution - Internet, history, Internet Service Providers, Types of Networks, IP, Domain Name Services, applications. Ethical and social implications: Network and security concepts- Information Assurance Fundamentals, Cryptography-Symmetric and Asymmetric, Malware, Firewalls, Fraud Techniques- Privacy and Data Protection

RECOMMENDED BOOKS:
1. Functions of one complex variable by John.B.Conway, Springer- Verlag.
2. Elementary Trigonometry by H.S.Hall and S.R.Knight
3. Vector Algebra by A.R.Vasishtha, Krishna Prakashan Media(P)Ltd.
4.Basic Statistics by B.L.Agarwal, New age international Publishers
5. University Physics with Modern Physics by Hugh D. Young and Roger A. Freedman
6. Fundamentals of Physics by David Halliday, Robert Resnick, and Jearl Walker
7. Physics for Scientists and Engineers with Modern Physics" by Raymond A. Serway and John W. Jewett Jr.
8. Physics for Technology and Engineering" by John Bird
9. Chemistry in daily life by Kirpal Singh
10. Chemistry of bio molecules by S. P. Bhutan
11. Fundamentals of Computers by V. Raja Raman
12. Cyber Security Essentials by James Graham, Richard Howard, Ryan Olson

STUDENT ACTIVITIES

UNIT I: ESSENTIALS OF MATHEMATICS:

1: Complex Number Exploration
Provide students with a set of complex numbers in both rectangular and polar forms. They will plot the complex numbers on the complex plane and identify their properties

 2: Trigonometric Ratios Problem Solving
Give students a set of problems that require the calculation of trigonometric ratios and their relations. Students will solve the problems using the appropriate trigonometric functions (sine, cosine, tangent, etc.) and trigonometric identities.

3: Vector Operations and Applications
Provide students with a set of vectors in Cartesian form. Students will perform vector addition and subtraction operations to find the resultant vectors. They will also calculate the scalar and vector products of given vectors.

4: Statistical Measures and Data Analysis Give students a dataset containing numerical values. Students will calculate the mean, median, and mode of the data, as well as other statistical measures if appropriate (e.g., range, standard deviation). They will interpret the results and analyze the central tendencies and distribution of the data.

UNIT II: ESSENTIALS OF PHYSICS:

1. Concept Mapping
Divide students into groups and assign each group one of the topics. Students will create a concept map illustrating the key concepts, relationships, and applications related to their assigned topic.
Encourage students to use visual elements, arrows, and labels to represent connections and interdependencies between concepts.

2. Laboratory Experiment Select a laboratory experiment related to one of the topics, such as motion of objects or electric and magnetic fields. Provide the necessary materials, instructions, and safety guidelines for conducting the experiment. Students will work in small groups to carry out the experiment, collect data, and analyze the results. After the experiment, students will write a lab report summarizing their findings, observations, and conclusions.

UNIT III: ESSENTIALS OF CHEMISTRY

1: Chemistry in Daily Life Presentation
Divide students into groups and assign each group a specific aspect of daily life where chemistry plays a significant role, such as food and nutrition, household products, medicine, or environmental issues. Students will research and create a presentation (e.g., PowerPoint, poster, or video) that showcases the importance of chemistry in their assigned aspect.

2: Periodic Table Exploration Provide students with a copy of the periodic table. Students will explore the periodic table and its significance in organizing elements based on their properties. They

will identify and analyze trends in atomic structure, such as electronic configuration, atomic size, and ionization energy.

3: Chemical Changes and Classification of Matter Provide students with various substances and chemical reactions, such as mixing acids and bases or observing a combustion reaction. Students will observe and describe the chemical changes that occur, including changes in color, temperature, or the formation of new substances.

4: Biomolecules Investigation Assign each student or group a specific biomolecule category, such as carbohydrates, proteins, fats, or vitamins. Students will research and gather information about their assigned biomolecule category, including its structure, functions, sources, and importance in the human body. They can create informative posters or presentations to present their findings to the class.

UNIT IV: APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1. Interdisciplinary Case Studies Divide students into small groups and provide them with interdisciplinary case studies that involve the interdisciplinary application of mathematics, physics, and chemistry. Each case study should present a real-world problem or scenario that requires the integration of concepts from all three disciplines.

2: Design and Innovation Project Challenge students to design and develop a practical solution or innovation that integrates mathematics, physics, and chemistry principles. Students can choose a specific problem or area of interest, such as renewable energy, environmental conservation, or materials science.

3: Laboratory Experiments assign students laboratory experiments that demonstrate the practical applications of mathematics, physics, and chemistry. Examples include investigating the relationship between concentration and reaction rate, analyzing the behavior of electrical circuits, or measuring the properties of materials.

4: Mathematical Modeling Present students with real-world problems that require mathematical modeling and analysis.

UNIT V: ESSENTIALS OF COMPUTER SCIENCE:

1. Identifying the attributes of network (Topology, service provider, IP address and bandwidth of

2. Your college network) and prepare a report covering network architecture.

3. Identify the types of malwares and required firewalls to provide security.

4. Latest Fraud techniques used by hackers.

Max. Marks: 30   **Max. Time: 90min**

SECTION-A

Answer all questions.

1.   (a)   3M

                              OR

        (b)   3M

   2. (a)   5 M

                              OR

        (b)   5 M

SECTION-B

Answer all questions.

1.   (a)   3M

                              OR

        (b)   3M

   2. (a)   5 M

                              OR

        (b)   5 M

SECTION-C (CHEMISTRY)

Answer all questions.

1.   (a) Define Chemistry, Explain different branches of Chemistry   2M

                              OR

        (b) Write the applications of chemistry in Food & Beverages Industry 2M

2. (a) Classify the matter with suitable examples and write electronic configuration for N, Cu & Cr chemical elements   5M

OR

(b) Define Biomolecules and explain the classification of Carbohydrates with suitable example.   5M

SECTION-D

Answer all questions.

1.   (a)   2M

OR

(b)   2M

2.   (a)   5 M

OR

(b)   5 M

MODEL PAPER FOR SEMESTER END EXAMINATION

With effect from 2023-2024

Title of the Paper ESSENTIALS AND APPLICATIONS OF MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Offered to: BSc(CHE,MATHS, PHY,STAT, CSC, AI,CSCS,DA,DS,ELE)

Course Type : Core (TH)

Max. Marks: 70   **Max. Time: 3 Hrs**

SECTION-A

Answer all questions.

1.   (a)   6M

                                    OR

        (b)   6M

2.   (a)   12M

                                    OR

        (b)   12M

SECTION-B

Answer all questions.

1.   (a)   6M

                                    OR

        (b)   6M

   2. (a)   12 M

                                    OR

        (b)   12 M

SECTION-C (CHEMISTRY)

Answer all questions.

1.   (a) Define Chemistry, Explain different branches of Chemistry   6M

                                    OR

        (b) Write the applications of chemistry in Food & Beverages Industry.   6M

 2.   (a) Classify the matter with suitable examples and write electronic configuration for N, Cu & Cr chemical elements   12M

                                    OR

         (b) Define Biomolecules and explain the classification of Carbohydrates with suitable example.   12M

SECTION-D

Answer all questions.

1.   (a)   4M

OR

   (b)   4M

2.   (a)   12 M

OR

   (b)   12 M

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Title of the Paper ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
Offered to: I B.Sc (CHE, MATHS, STAT, PHY, CSC, DA,DS,AI,CSCS,ELE)
Course Type : Core (TH)

Year of Introduction: 2023	**Year of offering: 2023**
Year of Revision: 2023-24	**Percentage of Revision:**
Semester: I	**Credits: 4**
Hours Taught: 60 hrs. Per Semester	**Max.Time**: 5Hours
Course Prerequisites (if any):	

I - SEMESTER
COURSE 2: ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES

Hours: 5 hrs/week   **Credits: 4**

COURSE OBJECTIVE:
The objective of this course is to provide students with an in-depth understanding of the recent advances and cutting-edge research in mathematical, physical, and chemical sciences. The course aims to broaden students' knowledge beyond the foundational concepts and expose them to the latest developments in these disciplines, fostering critical thinking, research skills, and the ability to contribute to scientific advancements.

LEARNING OUTCOMES:

1. Explore the applications of mathematics in various fields of physics and chemistry, to understand how mathematical concepts are used to model and solve real-world problems.

2. To explain the basic principles and concepts underlying a broad range of fundamental areas of physics and to connect their knowledge of physics to everyday situations.

3. Understand the different sources of renewable energy and their generation processes and advances in nano materials and their properties, with a focus on quantum dots. To study the emerging field of quantum communication and its potential applications. To gain an understanding of the principles of biophysics in studying biological systems. Explore the properties and applications of shape memory materials.

4. Understand the principles and techniques used in computer-aided drug design and drug delivery systems, to understand the fabrication techniques and working principles of nanosensors. Explore the effects of chemical pollutants on ecosystems and human health.

5. Understand the interplay and connections between mathematics, physics, and chemistry in various advanced applications. Recognize how mathematical models and physical and chemical principles can be used to explain and predict phenomena in different contexts.

6 Understand and convert between different number systems, such as binary, octal, decimal, and hexadecimal. Differentiate between analog and digital signals and understand their characteristics. Gain knowledge of different types of transmission media, such as wired (e.g., copper cables, fiber optics) and wireless (e.g., radio waves, microwave, satellite).

UNIT I: ADVANCES IN BASICS MATHEMATICS   9hrs

Straight Lines: Different forms – Reduction of general equation into various forms –Point of intersection of two straight lines
Limits and Differentiation: Standard limits – Derivative of a function –Problems on product rule and quotient rule
Integration: Integration as a reverse process of differentiation – Basic methods of integration
Matrices: Types of matrices – Scalar multiple of a matrix – Multiplication of matrices – Transpose of a matrix and determinants

UNIT II: ADVANCES IN PHYSICS: 9hrs

Renewable energy: Generation, energy storage, and energy-efficient materials and devices. Recent advances in the field of nanotechnology: Quantum dots, Quantum Communication- recent advances in biophysics- recent advances in medical physics- Shape Memory Materials.

UNIT III: ADVANCES IN CHEMISTRY: 9hrs
Computer aided drug design and delivery, nano sensors, Chemical Biology, impact of chemical pollutants on ecosystems and human health, Dye removal - Catalysis method

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY
                                                                      9hrs
Mathematical Modeling applications in physics and chemistry Application of Renewable energy: Grid Integration and Smart Grids, Application of nanotechnology: Nanomedicine, Application of biophysics: Biophysical Imaging, Biomechanics, Neurophysics, Application of medical physics: Radiation Therapy, Nuclear medicine Solid waste management, Environmental remediation- Green Technology, Water treatment.

UNIT V: ADVANCED APPLICATIONS OF COMPUTER SCIENCE   9hrs

Number System-Binary, Octal, decimal, and Hexadecimal, Signals-Analog, Digital, Modem, Codec, Multiplexing, Transmission media, error detection and correction- Parity check and CRC, Networking devices- Repeater, hub, bridge, switch, router, gateway.

RECOMMENDED BOOKS:
1. Coordinate Geometry by S.L.Lony, Arihant Publications
2. Calculus by Thomas and Finny, Pearson Publications
3. Matrices by A.R.Vasishtha and A.K.Vasishtha, Krishna Prakashan Media(P)Ltd.
4. "Renewable Energy: Power for a Sustainable Future" by Godfrey Boyle
5. "Energy Storage: A Nontechnical Guide" by Richard Baxter
6. "Nanotechnology: Principles and Applications" by Sulabha K. Kulkarni and Raghvendra A. Bohara

7. "Biophysics: An Introduction" by Rodney Cotterill
8. "Medical Physics: Imaging" by James G. Webster
9. "Shape Memory Alloys: Properties and Applications" by Dimitris C. Lagoudas
10. Nano materials and applications by M.N.Borah
11. Environmental Chemistry by Anil.K.D.E.
12. Digital Logic Design by Morris Mano
13. Data Communication & Networking by Bahrouz Forouzan.

STUDENT ACTIVITIES

UNIT I: ADVANCES IN BASIC MATHEMATICS

1: Straight Lines Exploration Provide students with a set of equations representing straight lines in different forms, such as slope-intercept form, point-slope form, or general form. Students will explore the properties and characteristics of straight lines, including their slopes, intercepts, and point of intersection.

2: Limits and Differentiation Problem Solving
Students will apply the concept of limits to solve various problems using standard limits.Encourage students to interpret the results and make connections to real-world applications, such as analyzing rates of change or optimizing functions.

3: Integration Exploration
Students will explore the concept of integration as a reverse process of differentiation and apply basic methods of integration, such as the product rule, substitution method, or integration by parts.
Students can discuss the significance of integration in various fields, such as physics and chemistry

4: Matrices Manipulation
Students will perform operations on matrices, including scalar multiplication, matrix multiplication, and matrix transpose. Students can apply their knowledge of matrices to real-world applications, such as solving systems of equations or representing transformations in geometry.

UNIT II: ADVANCES IN PHYSICS:

1: Case Studies
Provide students with real-world case studies related to renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials. Students will analyze the case studies, identify the challenges or problems presented, and propose innovative solutions based on the recent advances in the respective field. They will consider factors such as energy generation, energy storage, efficiency, sustainability, materials design, biomedical applications, or technological advancements.

2: Experimental Design
Assign students to design and conduct experiments related to one of the topics: renewable energy, nanotechnology, biophysics, medical physics, or shape memory materials. They will identify a specific research question or problem to investigate and design an experiment accordingly. Students will collect and analyze data, interpret the results, and draw conclusions based on their findings.

They will discuss the implications of their experimental results in the context of recent advances in the field.

3: Group Discussion and Debate
Organize a group discussion or debate session where students will discuss the ethical, social, and environmental implications of the recent advances in renewable energy, nanotechnology, biophysics, medical physics, and shape memory materials. Assign students specific roles, such as proponent, opponent, or moderator, and provide them with key points and arguments to support their positions.

UNIT III: ADVANCES IN CHEMISTRY:

1. Experimental Design and Simulation
In small groups, students will design experiments or simulations related to the assigned topic.
For example, in the context of computer-aided drug design, students could design a virtual screening experiment to identify potential drug candidates for a specific disease target.
For nano sensors, students could design an experiment to demonstrate the sensitivity and selectivity of nano sensors in detecting specific analytes. Chemical biology-related activities could involve designing experiments to study enzyme- substrate interactions or molecular interactions in biological systems. Students will perform their experiments or simulations, collect data, analyze the results, and draw conclusions based on their findings.

2. Case Studies and Discussion
Provide students with real-world case studies related to the impact of chemical pollutants on ecosystems and human health. Students will analyze the case studies, identify the sources and effects of chemical pollutants, and propose mitigation strategies to minimize their impact. Encourage discussions on the ethical and environmental considerations when dealing with chemical pollutants.
For the dye removal using the catalysis method, students can explore case studies where catalytic processes are used to degrade or remove dyes from wastewater. Students will discuss the principles of catalysis, the advantages and limitations of the catalysis method, and its applications in environmental remediation.

3: Group Project
Assign students to work in groups to develop a project related to one of the topics. The project could involve designing a computer-aided drug delivery system, developing a nano sensor for a specific application, or proposing strategies to mitigate the impact of chemical pollutants on ecosystems.
Students will develop a detailed project plan, conduct experiments or simulations, analyze data, and present their findings and recommendations. Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT IV: ADVANCED APPLICATIONS OF MATHEMATICS, PHYSICS & CHEMISTRY

1: Mathematical Modelling Experiment
Provide students with a mathematical modeling experiment related to one of the topics. For example, in the context of renewable energy, students can develop a mathematical model to optimize the placement and configuration of solar panels in a solar farm. Students will work in teams to design and conduct the experiment, collect data, and analyze the results using mathematical models and statistical techniques.
They will discuss the accuracy and limitations of their model, propose improvements, and interpret the implications of their findings in the context of renewable energy or the specific application area.

2: Case Studies and Group Discussions

Assign students to analyze case studies related to the applications of mathematical modeling in nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

Students will discuss the mathematical models and computational methods used in the case studies, analyze the outcomes, and evaluate the effectiveness of the modeling approach.

Encourage group discussions on the challenges, ethical considerations, and potential advancements in the field.

Students will present their findings and engage in critical discussions on the advantages and limitations of mathematical modeling in solving complex problems in these areas.

3. Group Project

Assign students to work in groups to develop a group project that integrates mathematical modelling with one of the application areas: renewable energy, nanotechnology, biophysics, medical physics, solid waste management, environmental remediation, or water treatment.

The project could involve developing a mathematical model to optimize the delivery of radiation therapy in medical physics or designing a mathematical model to optimize waste management practices.

Students will plan and execute their project, apply mathematical modeling techniques, analyze the results, and present their findings and recommendations.

Encourage creativity, critical thinking, and collaboration throughout the project.

UNIT V: ADVANCED APPLICATIONS OF COMPUTER SCIENCE

1. Students must be able to convert numbers from other number system to binary number systems
2. Identify the networking media used for your college network
3. Identify all the networking devices used in your college premises.

MODEL PAPER FOR INTERNAL EXAMINATION
With effect from 2023-2024
Title of the Paper ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
Offered to: BSc(CHE,MATHS, PHY,STAT, CSC, AI,CSCS,DA,DS,ELE)
Course Type : Core (TH)

Max. Marks: 30   **Max. Time: 90min**

SECTION-A

Answer all questions.

2.   (a)   3M

OR

(b)   3M

2.   (a)   5 M

OR

(b)   5 M

SECTION-B

Answer all questions.

2.   (a)   3M

OR

(b)   3M

2.   (a)   5 M

OR

(b)   5 M

SECTION-C (CHEMISTRY)

Answer all questions.

2.   (a) Explain different types of drug delivery   2M

OR

(b) Explain the applications of CADD   2M

2. (a) Discuss about Principle and process of CADD   5M

OR

(b) Write note on different types of nano sensors   5M

SECTION-D

Answer all questions.

2.   (a)   2M

                                      OR

     (b)   2M

2.   (a)   5 M

                                      OR

      (b)   5 M

MODEL PAPER FOR SEMESTER END EXAMINATION
With effect from 2023-2024
Title of the Paper ADVANCES IN MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES
Offered to: BSc(CHE,MATHS, PHY,STAT, CSC, AI,CSCS,DA,DS,ELE)
Course Type : Core (TH)

Max. Marks: 70   **Max. Time: 3 Hrs**

SECTION-A

Answer all questions.

  1(a)   6M

OR

  (b)   6M

  2. (a)   12M

OR

  (b)   12M

SECTION-B

Answer all questions.

  3 (a)   6M

OR

  (b)   6M

  4. (a)   12 M

OR

  (b)   12 M

SECTION-C (CHEMISTRY)

Answer all questions.

  5.(a)Explain different types of drug delivery   6M

OR

  (b) Explain about types of Nano sensors   6M

  6. (a) Discuss about Principle and process of CADD   12M

OR

  (b) Discuss the impact of chemical pollutants on eco system and human health   12M

SECTION-D

Answer all questions.

7.(a)   4M

OR

  (b)   4M

8. (a)   12 M

OR

  (b)   12 M

VALUE ADDED COURSE

Title of the Paper BASIC ANALYTICAL METHODS IN CHEMISTRY

Theory Hrs/Week: 2   **Credits: 2**

1. To develop expertise relevant to the professional practice of chemistry
2. To develop an understanding of the range and theories of volumetric methods available in analytical chemistry
3. To develop an understanding of the role of the chemist in measurement and problem solving in chemical analysis
4. To provide an understanding of and skills in advanced methods of separation and analysis
5. To provide basic knowledge in selected analytical methods of analysis

COURSE OUTCOMES:

By the end of the course students will be able to

S.No:1	Course Code:	Title of the paper: <u>Basic Analytical methods in Chemistry</u>	Mapping with PO'S	Mapping with PSO's
CO 1		To develop expertise relevant to the professional practice of chemistry	1	2
CO 2		. To develop an understanding of the range and theories of volumetric methods available in analytical chemistry	1	2
CO 3		. To develop an understanding of the role of the chemist in measurement and problem solving in chemical analysis	1	2
CO 4		To provide an understanding of and skills in advanced methods of separation and analysis	1	2
CO 5		To provide basic knowledge in selected analytical methods of analysis	1,7	2

Unit-I
- Definition of Acid and Base. Theories of Acid & Base.
- Definition of P^H and P^H scale.
- Definition of Buffers & Buffer equation.
- Volumetric analysis. Acid-base titrations. Acid and base indicators.

Unit-II
- Treatment of analytical data
- Definition of error, classification of errors, minimization of errors
- Accuracy & precision
- Methods expressing accuracy & precision

Unit-III
- Definition of distillation, principle of distillation
- Types of distillation, Simple distillation, Steam distillation
- Recrystalization: Principle and procedure solvent used in recrystalyzation
- Solvent extraction: Simple or batch solvent extraction, factors effecting solvent extraction.

MODEL QUESTION PAPER FOR INTERNAL EXAMINATION

VALUE ADDED COURSE
Title of the Paper: BASIC ANALYTICAL METHODS IN CHEMISTRY

MAX MARKS: 20M   **Duration: 60 Minutes**

Answer any FOUR of the following questions   **4x5=20 M**

1. Define acid and base by using any one theory

2. Define buffer solution and state buffer equation.

3. Define P^H and determine acid and base by using P^H scale.

4. Define error and write classification of error

5. Define accuracy and method expressing accuracy

6. Explain the methods for minimization of error.

MODEL QUESTION PAPER FOR SEMSTER END EXAMINATION

VALUE ADDED COURSE
Title of the Paper: BASIC ANALYTICAL METHODS IN CHEMISTRY

MAX MARKS: 30M   **Duration: 90 Minutes**

SECTION-A
Answer all the questions   **3x3=9 M**

1. a) Define Buffer solution and state buffer equation.
                                  Or
   b) Define Indicator and write any two acid base indicators

2. a) Describe Accuracy in analytical data
                                  Or
   b) Describe precision in analytical data

3. a) Discuss about principle of distillation
                                  Or
   b) Discuss about principle of Recrystallization.

SECTION-B

Answer all the questions   **3x7=21 M**

1. a) Define Acid and Base and explain the theories of Acid and Base.
                                  Or
   b) Define P^H , differentiate acid and base by using P^H Scale.

2. a) Define Errors and classification of errors
                                  Or
   b) Describe methods expressing Accuracy

3. a) Write a note on steam distillation
                                  Or
   b) Describe Batch extraction process.